Attachment 4 – Project Description

Att4_LGA12_NSJCGBA_ProjD_1of1

Provide a complete, detailed description of the proposed project, including the goals of the project, needed facilities and their location, and the area covered. Maps are generally not required (also see Attachment 5), but can be very helpful in explaining the proposed project.

The Northeastern San Joaquin County Groundwater Banking Authority (GBA) was formed in 2001 as a Joint Powers Authority (JPA) under California law to steer its planning efforts and provide solid governance for plan development and implementation.

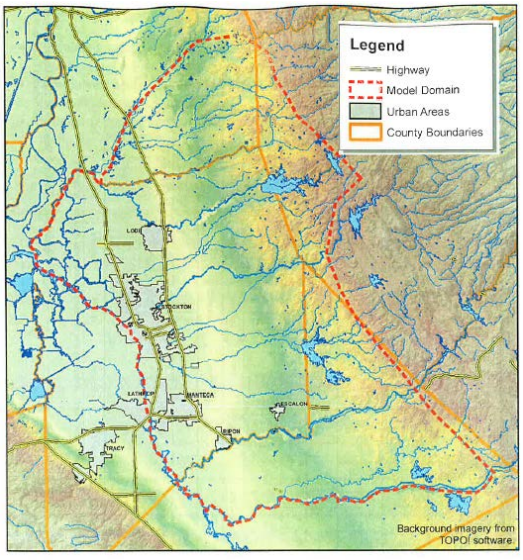
Two key water management issues within the region have been identified:

- Water demand exceeds available supplies. *Long-term groundwater overdraft due to lack of sufficient surface water supplies and long-term reliance on groundwater threatens the social, economic, and environmental viability of the San Joaquin Region.*

- Groundwater overdraft has reversed historical groundwater gradients and induced movement of poor quality water. *Without action, groundwater levels will continue to decline resulting in saline groundwater intrusion from the west, reduction in groundwater quality due to elevated nitrates and salts, increased pumping costs, increased seepage losses from local rivers and streams, increased lateral inflow from neighboring sub-basins, and other potentially devastating groundwater and surface water impacts.*

While other issues also exist, these two problems, their solutions, and the funding required to evaluate and implement the solutions, further bind the Region together.

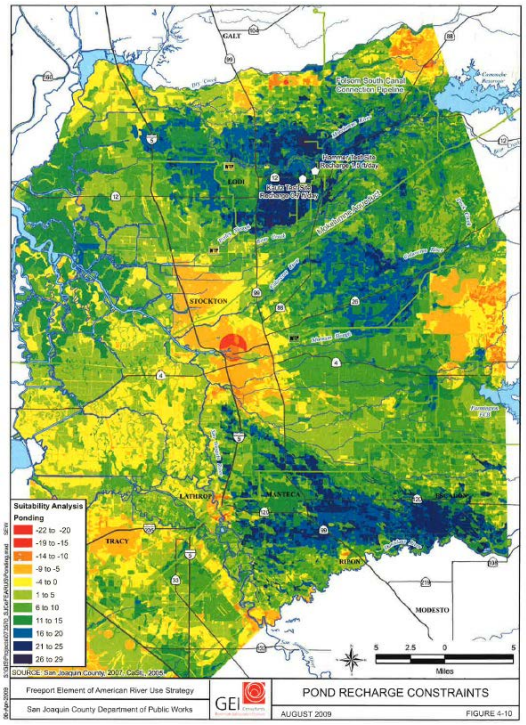
In its 2004 Groundwater Management Plan, the GBA adopted Basin Management Objectives that included enhanced groundwater elevations, basin-wide monitoring and science programs, and development of operation criteria for protection against prolonged droughts and the prevention of Basin mismanagement.[4]



A planning-level groundwater model was subsequently developed as part of the 2007 Eastern San Joaquin IRWMP.[5] This model was used to test regional basin response to program alternatives, and to determine how groundwater elevations could be managed within acceptable ranges. The model included the entire IRWM Region, as well as adjacent areas to the north, east, and south to establish stable boundary conditions and evaluate impacts on these areas.

[4] NSJCGBA, June 2004, "Eastern San Joaquin Groundwater Basin Groundwater Management Plan", p.79
[5] NSJCGBA, July 2007, "Eastern San Joaquin Integrated Regional Water Management Plan", p.6-14, p.7-70

Additional studies performed as part of the 2011 Freeport Element study defined the most promising areas for groundwater recharge.[6] Continuing this path of continued data gathering and program refinement, the GBA now wishes to develop a more discrete modeling tool focused on these most promising areas.



The model proposed for development under this grant application will be used to:

1. Develop a regional groundwater banking site selection and monitoring model
2. Determine best recharge sites
3. Test banking scenarios
4. Establish groundwater management operational thresholds
5. Plan variations in amount and locations of pumping to better utilize the basin storage capacity
6. Facilitate development of Eastern San Joaquin Water Bank

The proposed more detailed model will be based on the U.S. Geological Survey Central Valley Hydrologic Model (CVHM) and its associated data sets.[7] The CVHM was created to model the entire Central Valley on regional level. The model will be refined to a more localized scale to address the objectives of the GBA and the Integrated Conjunctive Use Project. The CVHM is comprised of four major elements:

(1) a comprehensive Geographic Information System (GIS) to compile, analyze and visualize data;

(2) a texture model to characterize the aquifer system;

(3) estimates of water-budget components by numerically modeling the hydrologic system with the Farm Process (FMP); and

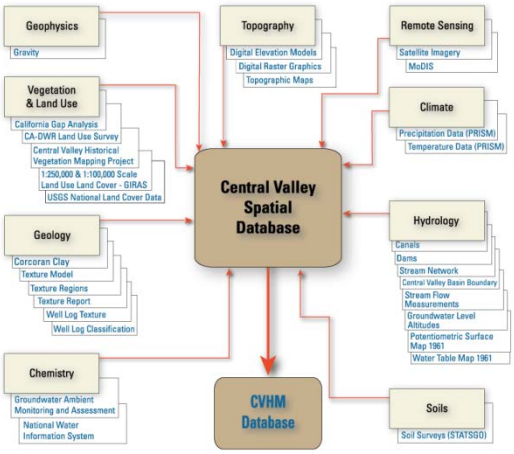
(4) simulations to assess and quantify hydrologic conditions.

A comprehensive geospatial database was developed using GIS to compile, manage, store, and analyze the large quantities of data needed to run the model, and to understand and visualize the data output.

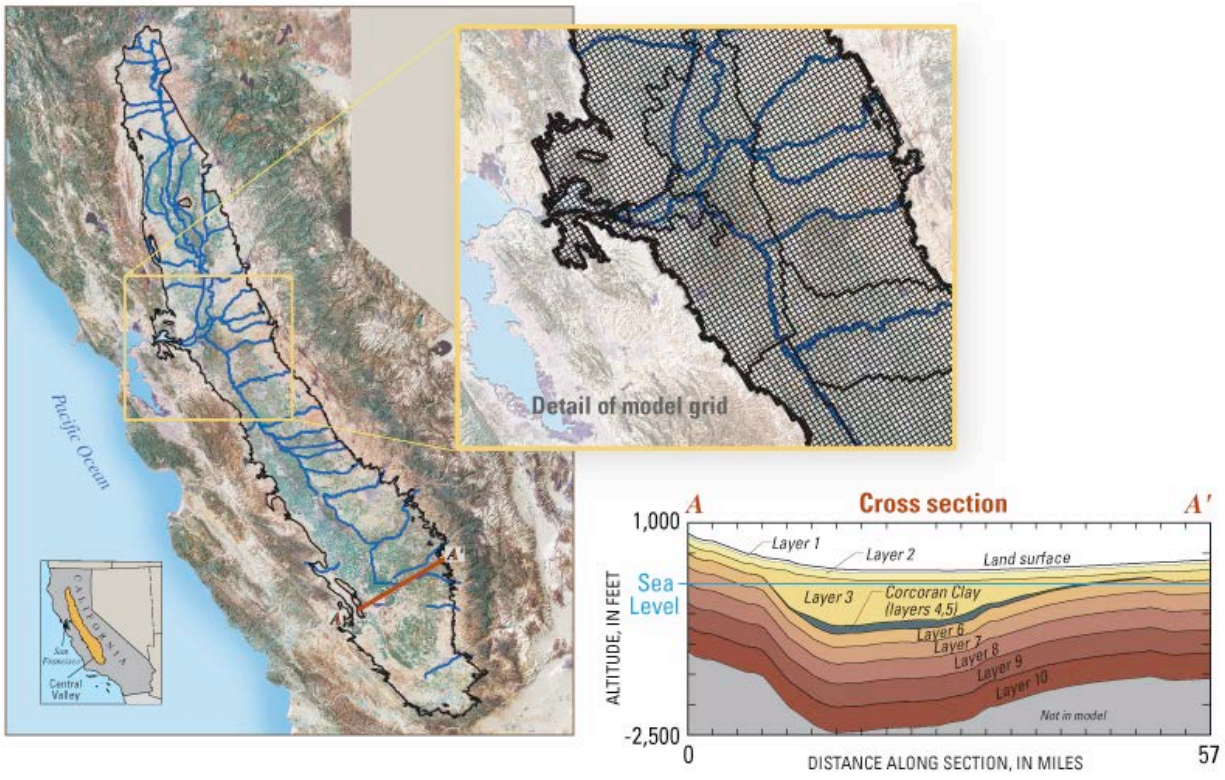
[6] San Joaquin County, August 2011, "Freeport Element of the American River Use Strategy Phase I: Final Draft Feasibility Study", p.4-25

[7] Faunt, C.C., ed., 2009, "Groundwater Availability of the Central Valley Aquifer, California," U.S. Geological Survey Professional Paper 1766

A geologic texture model was developed to characterize the coarseness of valley-fill materials that comprise the aquifer system. Lithologic data from approximately 8,500 drillers' logs of boreholes ranging in depth from 12 to 3,000 feet below land surface, along with other information, were compiled and analyzed. The resulting geologic model was then used to estimate the hydraulic properties for every cell in the model. The texture model is fundamental to understanding how water moves through the Central Valley groundwater system.



The complex hydrologic system of the Central Valley is simulated by using the USGS hydrologic model, MODFLOW. Combined with the Farm Process, MODFLOW provides a tool to simulate natural and human-induced water movement and consumption over the landscape. Groundwater and surface-water flow are fully coupled. The model accounts for supply-constrained and demand-driven conjunctive use of water in agricultural, urban, and natural settings. In the Central Valley, the tool simulates unmetered historical pumpage and the delivery of surface water for 21 water-balance regions for water years 1962 to 2003.



Describe how the project supports the goals and objectives of the GWMP. Applicant must clearly explain the relevance of project to the GWMP.

The MODFLOW numerical groundwater-flow model capable of accuracy at scales relevant to water-management decisions was developed for the Central Valley of California. This model will be further discretized in candidate recharge areas near Lodi and Stockton to help determine the physical and operational feasibility of establishing groundwater recharge and banking programs in these areas.

In order to meet the goals of the Groundwater Management Plan and ensure the long-term sustainability of the Basin, the Groundwater Banking Authority created the following Plan objectives:[8]

1. Maintain long-term sustainability of the Basin by developing management objectives, practices and conjunctive use projects to benefit the social, economic and environmental viability of Eastern San Joaquin County.
2. Prevent further saline intrusion and degradation of groundwater quality throughout the Basin.
3. Increase understanding of Basin dynamics by developing of a sound research program to monitor, evaluate, and predict Basin conditions.
4. Maintain local control of the groundwater Basin through the responsible management of groundwater resources by overlying cities, counties, water districts, agencies, and landowners.
5. Formulate rational and attainable Basin management objectives to comply with SB 1938 and retain State funding eligibility.
6. Formulate voluntary policies, practices, and incentive programs to meet established Basin management objectives.
7. Formulate appropriate financing strategies for the implementation of the Plan.

A description of how the project supports the goals and objectives of the GWMP is presented as Table 2.

[8] NSJCGBA, June 2004, "Eastern San Joaquin Groundwater Basin Groundwater Management Plan", p.22

Table 2 - Relevance of Proposed Project to Groundwater Management Plan Goals and Objectives

Groundwater Management Plan Objective	Relevance of Proposed Project
1. Maintain long-term sustainability of the Basin by developing of management objectives, practices and conjunctive use projects to benefit the social, economic and environmental viability of Eastern San Joaquin County.	• Project will evaluate practicality and efficacy of proposed groundwater elevation target management objectives
2. Prevent further saline intrusion and degradation of groundwater quality throughout the Basin.	• Project will be show changes to landward gradient and thus predict slowing or reversal of saline water movement
3. Increase understanding of Basin dynamics by developing of a sound research program to monitor, evaluate, and predict Basin conditions.	• Modeling effort will utilize regional hydrogeologic conceptualization developed by USGS and incorporate more detailed local knowledge of groundwater elevations, flow directions, and groundwater movement to production aquifers • Modeling effort will show where any significant data gaps exist, allowing focused data collection in most effective locations
4. Maintain local control of the groundwater Basin through the responsible management of groundwater resources by overlying cities, counties, water districts, agencies, and landowners.	• Project will allow testing of promising groundwater recharge locations and quantities to determine best operational practices to control and optimize groundwater resources
5. Formulate rational and attainable Basin management objectives to comply with SB 1938 and retain State funding eligibility.	• The model will be used to evaluate reasonableness of the BMOs adopted by the GBA in 2004
6. Formulate voluntary policies, practices, and incentive programs to meet established Basin management objectives.	• Project will be used to evaluate the most effective groundwater management practices, and identify beneficiaries • Project will be used to assess recharge locations and operations that will maximize water quality and minimize risk of contamination
7. Formulate appropriate financing strategies for the implementation of the Plan.	• Project will allow identification of beneficiaries under a variety of configurations and operation scenarios to allow fair and equitable financing strategies

Describe the quality and usefulness of the information that will be obtained using technically feasible methods. Include a discussion of data, technical methods, and analyses to be used. The level of detail should be sufficient to determine the technical feasibility of the proposed project.

The project will be based on the publically available, non-proprietary MODFLOW model developed and maintained by the U.S. Geological Survey (USGS). The use of this model will ensure that the model can be peer reviewed and that the model code will be technically correct, accessible to a wide user group, and maintained using non-local (i.e. USGS) funds. The CVHM model grid will be further refined (i.e. developed with smaller grid cells) using the enhanced textural analysis and aquifer parameters generated from the Project. Data will be supplemented as appropriate from other publically available sources including water demand data from published 2010 Urban Water Management Plans, and the San Joaquin County Data Center water level database.

A refinement of agricultural water use and production will be performed as part of this work (see Sections 3 and 4 of the Work Plan). Agricultural water production will likely be the most significant stress on the model, and by refining the distribution and using the local information (e.g. water demand) the Project should generate a more accurate model. The USGS data, supplemented with this more recent information, will be more than sufficient to determine the technical feasibility of the project.

Describe how the applicant collaborates with other local public agencies with regard to the management of the affected groundwater basin. Discuss and provide evidence that a process is or will be in place that informs groundwater users, stakeholders, and the general public about the project to be funded with the proposed grant and disseminates relevant reports and data. A stakeholder is an individual, group, coalition, agency or others who are involved in, affected by, or have an interest in the implementation of a specific program or project.

The Northeastern San Joaquin County Groundwater Banking Authority (GBA) is the primary forum for collaboration on water management in the region. The GBA is the Regional Water Management Group charged with developing the GMP, the IRWMP, and this grant application. The GBA is a local agency as defined in CWC 10701(a).

The GBA is a Joint Powers Authority formed in 2001 to provide regional water management to correct declining groundwater levels in the non-Delta portions of the Eastern San Joaquin Groundwater Basin. The GBA provides regional water management services for this area, and it organized the planning group that developed the IRWMP and the associated Environmental Impact Report. In 2009, the Region participated in the Department of Water Resources' (DWR) Region Acceptance Process (RAP) and was unconditionally accepted to compete in the next round of IRWMP grants.

The planning group includes 14 water agencies, 13 municipal and county agencies, six state and federal agencies, and over 14 community interest groups. These groups are listed in Table 1 in Attachment 2.

By definition, each member agency of the GBA is there willingly, and there by resolution of its governing body.

This inclusive group of participants guided the development of the IRWMP through a Coordinating Committee and a Board appointed by the represented water management groups. The Board and Coordinating Committee have endorsed GBA's submittal of the IRWMP and related documents (e.g. EIR, grant applications, RAP) as the Regional Water Management Group. The GBA serves as a clearinghouse for information, informing stakeholders and disseminating reports and data to groundwater users, agencies and the general public.

Explain and document how federal and other State agencies will be contacted. Examples include workshops, regularly scheduled groundwater association meetings, public notices, informational mailings, and websites.

The GBA has been meeting on a monthly or more frequent basis for 12 years. Facilitation of GBA meetings is provided through a DWR grant. A DWR representative regularly attends and participates in GBA discussions. GBA meetings are publically noticed, with agendas and meeting minutes posted on the GBA website (www.gbawater.org). Project reports and other information are also published on the GBA website.

The GBA has recently completed a cooperative study with DWR and the U.S. Geological Survey to evaluate regional hydrogeology and determine the sources of saline water migration in the western portion of the project area. Additional state and federal agencies were contacted regarding the GBA's 2011 environmental documentation for the Integrated Conjunctive Use Project, and several entities submitted comments.

The nature of this modeling project is such that CEQA compliance or property access will not be required.

Explain how ongoing use of the products derived from the proposed project will be funded after grant funds are expended. Additional State grant funds to continue with the funded project should not be a consideration. Provide examples of how often and under what funding mechanism monitoring wells will continue to be monitored, models maintained and used in the future, automated monitoring equipment maintained, or data management systems be updated and maintained. Include a discussion of measures that will be used to evaluate data and mechanisms to adapt the data collection process as new information is obtained.

Regional modeling of the groundwater basin was performed as part of the 2007 IRWMP development. The regional modeling was used to test water level responses to recharge and banking alternatives, to evaluate proposed basin management objectives, and to determine regional groundwater flow directions. The more refined modeling proposed under this grant application will be used to perform a more detailed, more localized examination of specific groundwater recharge and groundwater banking proposals. Two such proposals will be initially evaluated. This more detailed modeling will determine the potential for mounding, groundwater migration, and potential impacts to other groundwater users. It is anticipated that the more refined model will be used by proponents of the proposed projects. If initial feasibility is established, future use of the model will be funded by these project proponents. The use of a publically-available, non-proprietary model will minimize the need to upgrade or update the model code. Water level data, pumping data, and new well logs will continue to be compiled by the San Joaquin County Department of Public Works as part of its ongoing mission. The new information will be freely available to project proponents for updating the model data sets in the future.